

Upcoming changes to the Physics Major

November 2022

The Physics Department has passed the following changes to its courses and its major. This document is to make students and advisors aware of the upcoming changes. The changes below will be submitted for college approval in Spring 2023 and are anticipated to be adopted for the 2023-2024 academic year. Junior and Senior declared majors should consult their physics faculty advisor if exceptions to these changes need to be made to accommodate them.

1. Schedule changes for some of our majors' courses

Starting in the 2023-24 school year, some of our majors' courses will be offered in different blocks than in years past. See attached draft grid for next year. Affected courses are: PC 311, PC 353, PC 357, PC 358, PC 362, PC 354, PC 333.

The attached "paths through the major" document shows the intended sequences of courses.

2. Redesign of PC 311 Vector and PC 353 E&M Theory

In spring 2024, PC 311 Vector and PC 353 E&M Theory will be taught consecutively in Blocks 7 and 8. In spring 2025, PC 311 and PC 353 will be taught as a single two block course (Vector+E&M Theory) over Blocks 7-8. The content will be similar to the old courses, but the math and physics will be taught in an integrated manner. Students will no longer be able to take a single block PC 311 or a single block PC 353 course.

It is intended that students will take the new two block course in the spring of their junior year.

This means that anyone taking PC 311 Vector in Block 8 2023 or Block 7 2024 and who wants to take PC 353 E&M Theory as a stand-alone course must do so in Block 8 2024.

3. Offering PC 354 every other year

PC 354 Optics will be offered every other year alternating with PC 333 Solid State in Block 2. PC 354 will be offered in Block 2 2023, PC 333 in Block 2 2024, PC 354 in Block 2 2025 and so on.

4. Changes to major requirements

Only courses PC 320 and higher will be allowed as an elective course in the physics major for any emphasis.

This means students should not take PC 311 Vector in Block 8 2023 or Block 7 2024 intending to count it as an elective in the major.

5. Changes to course pre-requisites

To accommodate our new emphasis on computation throughout the curriculum, the following pre-requisites will be changed.

- PC 251 Modern Physics is a pre-requisite for PC 261 Electronics.
- PC 261 Electronics is a pre-requisite for PC 341 Mechanics, PC 349 Thermal, PC 353 E&M Theory (and the new 2 block Vector+E&M Theory course), and PC 441 Quantum Mechanics
- PC 251 Modern Physics and PC 261 Electronics are pre-requisites for PC 253 Computational Physics.
- PC 251 Modern Physics and one physics course numbered PC 320 or higher are pre-requisites for PC 450 Senior Capstone Experience.

The implications of this are as follows: Immediately after taking PC 251 Modern Physics in Block 3, students should take PC 261 Electronics in Blocks 4 or 5. This sets up the student to take most upper division courses.

Ideally students should take PC 251 in their second year, but it is also possible for students to take it in their third year. See “paths through the major” document.

6. Changes to Astrophysics emphasis

The Astrophysics emphasis will no longer require PC 349 Thermal but will instead require PC 353 E&M Theory (and the 2 block Vector+E&M Theory course starting in 24-25). However, students intending graduate school in astronomy should really take both courses.

2023-2024 Class Schedule

10/25/2022

Professor	Block 1	Block 2	Block 3	Block 4	½ Blk	Block 5	Block 6	Block 7	Block 8
Burns	PC 133 Astronomy		PC 251 Modern Physics				PC 341 Mechanics		
Cervantes		PC 242 Physics for the Physical Sciences II	PC 441 Quantum I	PC 442 Quantum II		PC 241 Physics for the Physical Sciences I		PC 241 Physics for the Physical Sciences I	PC 242 Physics for the Physical Sciences 2
Gosnell	sabbatical	sabbatical	sabbatical	sabbatical		sabbatical	sabbatical	sabbatical	sabbatical
Krishnarao			PC 251 Modern Physics	PC 261 Electronics		PC 357 Astrophysics		PC 362 Observational Astronomy	PC 391 Investigations
Lang		PC 242 Physics for the Physical Sciences 2				PC 151 Biophysics			PC 353 E&M Theory
Light	PC 450 Senior Seminar		CC 120 Failure	PC 391 Investigations		PC 261 Electronics	PC 349 Thermal Physics	PC 361 Techniques	
	PC 253 Computational Physics Adj								
Purdue	PC 241 Physics for Physical Sciences I	PC 354 Optics		PC 142 Physics for the Life Sciences 2		PC 391 Investigations		PC 311 Vector	PC 420 General Relativity
full year visitor	PC 133 Astronomy		PC 141 Physics for the Life Sciences I	PC 142 Physics for the Life Sciences 2			PC 141 Physics for the Life Sciences I	PC 241 Physics for the Physical Sciences I	PC 133 Astronomy
full year visitor	PC 241 Physics for Physical Sciences I		PC 141 Physics for the Life Sciences I	PC 320 Topics		PC 241 Physics for the Physical Sciences I	PC 141 Physics for the Life Sciences I		PC 242 Physics for the Physical Sciences 2
block visitor									PC 133 Astronomy
	PC 108 Introduction to Machining and Fabrication (Burt)				PC 210	PC 108 Introduction to Machining and Fabrication (Burt)			
	PC 132 Obs Astro for Amateurs Adjunct (Wetterer)				Investigations in Engineering:	PC 132 Obs Astro for Amateurs Adjunct (Wetterer)			

Paths Through the Physics Major

Classes that are moving in 23- 24 are in red

Required classes are bolded

Everything								
Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
First year					PC 241 Intro I		PC 241 Intro I	PC 242 Intro II
Second year	Intro I	Intro II	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 361 & PC 362 Techniques Observational	
Third year		PC 354/PC 333 Optics/Solid State		PC 320 Topics	PC 357/358 Astro/Galactic	PC 349 Thermal	PC 311 Vector	PC 353 E&M
	PC 253 Computational Physics							
Fourth year	PC 450 Capstone	PC 320 Topics	PC 441 Quantum I	PC 442 Quantum II	PC 357/358 Astro/Galactic			PC 420 Topics

Start in first year. Comprehensive

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
First year				MA 126 Calc I	MA 129 Calc II		PC 241 Intro I	PC 242 Intro II
Second year		MA 204 Calc III	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 361 Techniques	
Third year		PC 354/PC 333 Optics/Solid State	MA 220 Linear Algebra	PC 320 Topics		PC 349 Thermal	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 320 Topics	PC 441 Quantum I	PC 442 Quantum II				PC 420 Topics

Start in second year. Comprehensive

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
Second year				MA 126 Calc I	MA 129 Calc II		PC 241 Intro I	PC 242 Intro II
Third year	MA 220 Linear Algebra	MA 204 Calc III	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 354/PC 333 Optics/Solid State	PC 441 Quantum I	PC 442 Quantum II		PC 349 Thermal	PC 361 Techniques	PC 420 Topics

Start in first year. Astro

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
First year				MA 126 Calc I	MA 129 Calc II		PC 241 Intro I	PC 242 Intro II
Second year		MA 204 Calc III	PC 251 Modern Physics	PC 261 Electronics	PC 261 Electronics	PC 341 Mechanics	PC 362 Observational	
Third year		PC 354 Optics	MA 220 Linear Algebra	PC 320 Topics	PC 357/358 Astrophysics/ Extragalactic	PC 349 Thermal	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 320 Topics	PC 441 Quantum I	PC 442 Quantum II	PC 357/358 Astrophysics/ Extragalactic			PC 420 Topics

Start in second year. Astro

Professor	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
Second year		MA126 Calc I	MA 129 Calc II		MA 204 Calc III		PC 241 Intro I	PC 242 Intro II
Third year	MA 220 Linear Algebra		PC 251 Modern Physics	PC 261 Electronics	PC 357/358 Astrophysics/ Extragalactic	PC 341 Mechanics	PC 311 Vector	PC 353 E&M
Fourth year	PC 450 Capstone	PC 354 Optics	PC 441 Quantum I	PC 442 Quantum II	PC 357/358 Astrophysics/ Extragalactic	PC 349 Thermal	PC 362 Observational	PC 420 Topics

Summary of Physics Major Options

Option	Liberal Arts Major	Comprehensive Major	Astro-physics Emphasis	Teaching Emphasis	Environmental Emphasis	Geophysics Emphasis	Chemistry/ Materials Science Emphasis	Computational Physics Emphasis
REQUIRED	MA 126 & 129 MA 204 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher)	MA 126 & 129 MA 204 MA 220 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 PC 311 PC 341 PC 349 PC 353 PC 441 +1 physics elective (320 or higher)	MA 126 & 129 MA 204 MA 220 PC 241 & 242 PC 251 PC 261 PC 361 PC 362 PC 450 PC 311 PC 341 PC 353 PC 357 PC 358 PC 441	MA 126 & 129 MA 204 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher) ED 100 ED 120 +2 lab-based intros in biology, chemistry, or geology	MA 126 & 129 MA 204 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 or EV 499 +2 physics electives (320 or higher; see recommended choices below) EV 128 EV 145 EV 333 EV science class (rec EV 212, EV315, EV 351, EV431) EV or SS class	MA 126 & 129 MA 204 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher; see recommended choices below)	MA 126 & 129 MA 204 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 +3 physics electives (320 or higher; see recommended choices below) CH 107 CH 108 CH 366 CH 367	MA 126 & 129 MA 204 PC 241 & 242 PC 251 PC 261 PC 361 or 362 PC 450 PC 253 +2 physics electives (320 or higher; see recommended choices below) CP 122 CP 222 CP 274 CP 275

Option	Liberal Arts Major	Comprehensive Major	Astro-physics Emphasis	Teaching Emphasis	Environmental Emphasis	Geophysics Emphasis	Chemistry/ Materials Science Emphasis	Computational Physics Emphasis
RECOMMENDED	Additional advanced physics or math courses.	PC 354 PC 442 PC 420 PC 253 CP 122 One or more summer research programs	PC 442 PC 349 PC 354 PC 420 PC 253 One or more summer research programs	PC 133 Additional education courses, such as ED 203 or 275 (ED 275 is particularly useful for those interested in Teach for America)	PC 333 PC 341 PC 349 PC 441 MA218/EV228 MA 220 MA 315 Intro courses in biology, chemistry, or geology One or more summer research programs	PC 333 PC 341 PC 349 PC 354 Additional advanced physics, geology, or math courses, esp. MA 313, MA 220, MA 316, MA 318 CP 122 CH 107 One or more summer research programs	PC 333 PC 349 PC 354 PC 441 PC 442 CH 241 CH 250 Additional advanced physics, chemistry, or math courses Additional lab work One or more summer research programs	PC 341 PC 349 PC 353 PC 441 PC 442 CP 344 CP 360 CP 407 MA 201 MA 220 MA 251 One or more summer research programs

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